Chapter 5: Facility Impact Analysis

Introduction

The ***facility*** impact analysis assesses whether the proposed MP&M effluent guidelines are likely to impose severe or moderate economic and financial impacts on MP&M facilities. EPA conducted tests of severe economic impacts to assess the rule's economic achievability. ***Severe impacts*** are facility closures and the associated losses in jobs, earnings, and output at facilities that close due to the rule. EPA also evaluated moderate economic impacts to support its evaluation of regulatory options and to understand better the rule's economic impacts. ***Moderate impacts*** are adverse changes in a facility's financial position that are not threatening to its short-term viability.

This regulation will affect three major categories of MP&M facilities: privately-owned, railroad line maintenance, and government-owned facilities. EPA developed separate analytic methodologies for each type of facility:

1. ***Private MP&M facilities***: This group includes all privately-owned facilities that do not perform railroad line maintenance. This major category of facilities operates in various subcategories and includes private businesses in a wide range of sectors or industries, including facilities that manufacture and rebuild railroad equipment. Only facilities that repair railroad track and equipment along the railroad line are excluded. There are 57,587 private MP&M facilities other than railroad line maintenance facilities nationally that may be affected by the rule, representing 91.8 percent of the 62,752 facilities that discharge process wastewater from MP&M activities.

2. ***Railroad line maintenance facilities***: Railroad line maintenance facilities maintain and repair railroad track and vehicles. EPA administered a separate economic and financial survey to these facilities and applied a different impact analysis methodology than that used for other private facilities. This methodology evaluated the aggregate impact of compliance costs for facilities owned by a single railroad company on the profitability and indebtedness of the railroad operating company as a whole. There are 832 railroad line maintenance facilities in the analysis, representing 1.3 percent of all facilities in the analysis.

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3. ***Government-owned facilities***: Government-owned facilities include MP&M facilities operated by municipalities, state agencies and other public sector entities such as state universities. Many of these facilities repair, rebuild, and maintain buses, trucks, cars, utility vehicles (e.g., snow plows and street cleaners), and light machinery. Government-owned facilities operate in two major subcategories: General Metals and Oily Waste. There are 4,332 government-owned facilities in the analysis, representing 6.9 percent of the total.

The specific methodology used to assess impacts differs for each of the three types of MP&M facilities. In each case, EPA established thresholds for measures of financial performance and compared facilities' performance before and after compliance with each regulatory option to these thresholds.

This chapter describes the methodology used to assess facility-level economic impacts for the three types of facilities, and then presents the results of the analyses.

5.1 Data Sources

The economic impact analyses rely on data provided by the financial portion of the detailed questionnaires distributed to MP&M facilities by EPA under the authority of Section 308 of the Clean Water Act. The surveys were conducted in two phases, covering different MP&M industries in each phase. The Phase I survey covered seven industry sectors and reported data for fiscal years 1987 to 1989. The Phase II survey covered an additional ten industry sectors (all remaining MP&M sectors except Steel Forming & Finishing, which was the subject of a separate survey) and reported data for fiscal years 1994 to 1996.[1] EPA administered each survey to a random stratified sample of facilities and assigned each facility a sample weight based on the stratification process and the number of facilities surveyed, so that sample-weighted results would represent all potentially-affected MP&M facilities in the U.S. The results of the impact analyses for the sample facilities were extrapolated to the national level using these facility sample weights.

The survey financial data for private businesses included three years of facility and parent firm income statements and balance sheets and the composition of revenues by MP&M business sector to which the facility's goods and services are sold. Two versions of the Phase II financial survey were used: the long survey, which also requested information on facility ***liquidation*** values, and the short form, which did not request liquidation values.

Data for facilities in the railroad line maintenance subcategory came from a modified version of the Phase II survey administered to railroad operating companies. The questionnaire was modified because railroad operating companies generally do not monitor financial performance or collect financial data at the facility level for their numerous line maintenance facilities. The railroad operating companies reported the number of line maintenance facilities in each operating unit, and provided both operating company and parent firm financial data. They also provided technical data for each line maintenance facility.

Data for facilities in the Steel Forming & Finishing subcategory came from a 1997 Section 308 survey of iron and steel facilities. This survey requested financial data generally similar to that collected by the MP&M surveys, including income statements and balance sheets for fiscal years 1995-1997 for the facility and the parent firm.

Government-owned MP&M facilities provided data in the Phase II Section 308 survey of municipal and other government agency facilities. This survey requested information on fiscal year 1996 sources and amounts of revenue and debt levels for both the government entity and their MP&M facilities, and demographic data for the population served by the government entity.

In addition to the survey data, a number of secondary sources were used to characterize economic and financial conditions in the industries subject to the MP&M effluent guidelines. Secondary sources used in the analyses include:

- Department of Commerce economic census and survey data, including the *Censuses of Manufactures, Annual Surveys of Manufactures,* and international trade data;
- The *Benchmark Input-Output Tables of the United States*, published by the U.S. Department of Commerce's Bureau of Economic Analysis;
- Price index series from the Bureau of Labor Statistics, Department of Labor;
- *U.S. Industry and Trade Outlook*, published by McGraw-Hill and the U.S. Department of Commerce; and
- Industry trade publications.

5.2 Methodology

The facility impact analysis starts with compliance cost estimates from the EPA engineering analysis and then calculates how these compliance costs would affect the financial condition of MP&M facilities. EPA first eliminated from the analysis those facilities showing inadequate financial performance in the baseline, that is, in the absence of the rule. ***Baseline closures*** at these facilities would have occurred with or without the rule. EPA performed a ***cost pass-through analysis*** based on historical input and output price changes for the years 1982 through 1991 to estimate how much prices might rise to help cover the costs of compliance. The Agency then evaluated how the compliance costs would likely affect the financial health of the facility, taking any price changes into account. A facility is identified as a ***regulatory closure*** if it would have operated under baseline conditions but would fall below an acceptable financial performance level when subject to the new regulatory requirements. An ***avoided baseline closure*** occurs if a facility fails the baseline tests but passes the post-compliance tests. An avoided baseline failure is rare but can occur when a facility that is very close to the financial thresholds benefits from industry-wide price

[1] Appendix A.1 provides a detailed description of the surveys and describes how EPA combined data from different surveys.

increases and incurs relatively low regulatory costs compared to its competitors.

EPA also identified private MP&M facilities that would likely incur some moderate impacts from the rule but that are not expected to close as a result of the rule. The test of moderate impacts examined baseline and post-compliance financial ratios. Incremental moderate impacts are attributed to the rule if both financial ratios exceeded threshold values in the baseline (i.e., there were no moderate impacts in the baseline), but at least one financial ratio fell below the threshold value in the post-compliance case.

5.2.1 Converting Engineering Compliance Costs and Financial Data

EPA made three adjustments to the engineering estimates of compliance costs to support the economic impact analyses.[2] First, the costs were converted to 1999 dollars. Second, the costs estimated for privately-owned facilities were adjusted for the effects of taxes. Finally, one-time capital costs were annualized, to provide a total annualized compliance cost for each facility.

EPA used two kinds of deflators to convert dollar values into 1999 constant dollar equivalents. The Agency used the ***Construction Cost Index*** **(CCI)** to update compliance costs. The CCI is a price index that engineers often use to estimate costs associated with building, installing, and operating waste treatment equipment and facilities. The CCI includes the costs of labor and building materials in 20 major cities. Table 5.1 shows CCI values from 1996 to 1999. Costs increased by 7.8 percent from 1996 to 1999.

Table 5.1: Construction Cost Index

Year	Value	% Change
1996	5620	
1997	5825	3.6%
1998	5920	1.6%
1999	6060	2.4%

Source: Engineering News-Record

EPA used the ***Producer Price Index*** **(PPI)** to update financial statement data for MP&M facilities. The PPI measures average changes in selling prices that domestic producers receive for their output. EPA used sector-specific PPI averages to update financial data from Phase I survey respondents to 1996, the base year of the analysis. EPA applied an aggregate PPI to update from 1996 to 1999 dollars for both Phase I and Phase II survey data.

Table 5.2 shows aggregate PPI values for all finished goods. Prices increased by 1.3 (133/131.3) percent from 1996 to 1999, and by 26.2 percent from 1987 to 1999 (133/105.4).

Table 5.2: Producer Price Index Industrial Commodities

Year	Value	% Change
1987	102.6	
1988	106.3	3.6%
1989	111.6	5.0%
1990	115.8	3.8%
1991	116.5	0.6%
1992	117.4	0.8%
1993	119.0	1.4%
1994	120.7	1.4%
1995	125.5	4.0%
1996	127.3	1.4%
1997	127.7	0.3%
1998	124.8	-2.3%
1999	126.5	1.4%

Source: Bureau of Labor Statistics

EPA adjusted compliance costs estimated for private sector facilities to take account of the tax deductibility of these costs. A 34 percent marginal income tax rate was used to adjust costs to an after-tax equivalent. This rate is the highest marginal federal corporate income tax rate, and is used as a proxy for the combined effect of federal and state income taxes. This report presents costs either before-tax or after-tax, depending on the purpose of the analysis.

Finally, EPA annualized one-time compliance costs (primarily capital costs) to provide annual costs that could be compared with annual facility revenues. ***Total annual compliance costs*** **(TACC)** is the sum of annual ***operating and maintenance*** **(O&M)** costs and the annualized equivalent of one-time costs, calculated over 15 years assuming a seven percent discount rate. The following is the formula used to annualize one-time costs:

$$Annualized\ Cost = PV \times \frac{r \times (1 + r)^n}{(1 + r)^n - 1} \qquad (5.1)$$

[2] The engineering cost estimates are described in the *Technical Development Document* accompanying this rule.

where:

PV = present value of compliance costs,
r = discount rate (7% in this analysis), and
t = amortization period (15 years).

5.2.2 Market-Level Impacts and Cost Pass-through Analysis

Increased costs associated with the proposed rule can be expected to affect industry level prices and output. Changes in prices and output in turn determine the ultimate distribution of economic impacts among directly- and indirectly-affected industries and their customers and suppliers. The facilities and industries directly affected by the proposed rule might ultimately experience little adverse impact, for example, if they are able to recover most or all of their added costs by raising prices to their customers or lowering the prices paid to their suppliers. Some regulated facilities and companies could even be better off financially as a result of the rule, if they benefit from industry-wide product price increases and incur no or relatively-low compliance costs (e.g., they already have treatment in place). Understanding impacts at the industry level is therefore important to understanding who bears the impacts of the proposed rule.

The MP&M effluent guidelines affect facilities in a very wide range of industries, and some of those industries produce a diverse slate of products that are sold in multiple industrial sectors. Detailed partial equilibrium modeling of product-level market dynamics in each of the affected industries was therefore not feasible. EPA instead used a combination of quantitative and qualitative methods to estimate a proportion of compliance costs that might be recovered through price increases in each MP&M sector. This cost pass-through analysis provided sector-specific coefficients that were applied to total compliance costs in each sector to estimate percentage changes in prices and revenues. EPA then evaluated facility-level impacts assuming that all analyzed facilities in each sector benefit from the same percentage increase in prices and revenues. EPA did not conduct a zero-***cost pass-through analysis***, because results of the Phase I analysis indicated that the complexity of presenting two sets of results were not warranted, given the slight difference in impact results between the two cases.

The estimated cost pass-through potential for each sector reflects an econometric analysis of historical pricing and cost trends in each MP&M industry, coupled with a qualitative market structure analysis. The market structure factors include:

- Market power based on horizontal and vertical integration;
- Extent of competition from foreign suppliers (in both domestic and export markets);
- Barriers to competition, as indicated by above-normal, risk-adjusted profitability; and
- The long-term growth trend in the industry.

EPA developed cost pass-through coefficients that indicate the percentage of compliance costs that EPA expects firms subject to regulation to recover from customers through increased revenues.[3] This approach may either overstate or understate the true changes in revenue for any one particular facility, depending on the diversity of products produced by the facility and the percentage of competitors in each product market that incur compliance costs.

This approach to estimating market-level adjustments is a simplification because it does not simultaneously estimate changes in prices and output. Instead, EPA estimated price changes and then estimated changes in output based on predicted closures, taking into account the effect of the predicted price increases on facilities' financial performance. It is difficult to assess how this simplified approach might affect the estimated economic impacts of the rule. However, EPA does not believe that the overall impact analysis results are highly sensitive to the potential biases introduced by this approach.

5.2.3 Impact Measures for Private Facilities

a. Test of severe impacts

The analysis of severe impacts estimates the number of facilities that could potentially close due to the regulation. EPA predicted that a facility will close if compliance costs cause the facility's overall financial performance to fall below threshold levels. Compliance costs are determined by the type and number of processes that a facility performs, the characteristics of its wastewaters, and the level of treatment performed in the baseline. EPA took the number and type of processes and pollutants produced into account when subcategorizing the industry. However, EPA was not able to link estimated compliance costs to specific products. Nor was EPA able to link facility financial performance to specific products. It was therefore not possible to conduct an impacts analysis at the product level.

In particular, the analysis does not consider output reductions short of closure -- for example, closing one of several production lines/processes or continuing to produce the same products at a reduced level. It is quite possible that a facility with no or relatively low compliance costs for most

[3] Appendix A.2 provides a detailed description of the cost pass-through analysis.

processes could choose to out-source products made using a process that had significant compliance costs associated with it, instead of performing the process in-house. This is particularly true if it is a process that is performed infrequently. It is also possible that firms with multiple facilities could consolidate similar processes at individual facilities to reduce their compliance costs. These situations are not considered in this economic impact analysis. There are likely to be numerous options available to firms and facilities that EPA is unable to model. Because of these unknowns, estimated severe impacts are worst case and are likely to be overstated. In addition, the relationship between the compliance costs associated with the specific processes performed, specific products made from these processes, and the multiple industrial sectors to which these products are sold, is unknown and can not be accounted for in this analysis.

The methodology examines two facility-level financial indicators to estimate closures.

After-Tax Cash Flow **(ATCF)**: EPA examined ATCF over a three-year period to determine the financial condition of private MP&M facilities. Facilities with negative cash flows were considered candidates for closure, since businesses generally cannot sustain a negative cash flow for long periods of time.

Net Present Value **(NPV)**: The present value of the expected future cash flows minus the cost. EPA also performed an NPV test for facilities that provided estimates of liquidation values. This test compared the facility liquidation value to the present value of expected future earnings. The conventional model of business management states that businesses can be expected to cease operations when the value of closing (i.e., its liquidation value) exceeds its value as an ongoing business (i.e., the present value of its expected future earnings).

The following sections describe the calculation of these two measures in more detail.

❖ ***After-tax cash flow test***

The ATCF test examined whether a facility would lose money on a cash basis over the three years covered by the surveys. If the facility suffers a cash loss on average, then EPA infers that the facility's management is under pressure to change operations or business practices to eliminate future losses. Management might do so by closing the facility. The ATCF test involves calculating each sample facility's average after-tax cash flow over the years for which survey respondents reported income statement data. The calculations are as follows:

1. *Compute after-tax cash flow in 1999 dollars:* EPA averaged income statement data over the years for which survey respondents reported data. For example, if a facility reported income statement data for 1995, 1996, and 1997, then a simple average was calculated for the three reported years and indexed to 1999 values. The ATCF is calculated from survey facility financial data as follows:

$$ATCF = ATI + D \quad (5.2a)$$

or,

$$ATCF = [REV - (TC+I+D+T)] + D = REV - TC - I - T \quad (5.2b)$$

where:

- ATI = after-tax income;
- D = depreciation;
- REV = revenue;
- TC = total costs, including operating costs and fixed costs;
- I = interest; and
- T = all income taxes.

EPA considered the facility to be a potential baseline closure if it had negative average ATCF before incurring regulatory compliance costs. Baseline closures were excluded from all further analyses.

2. *Compute the average post-regulation after-tax cash flow (ATCF), including regulatory compliance costs and increases in revenue.* EPA then examined the post-compliance cash flow of a facility with non-negative baseline cash flow, to determine both its compliance costs and the benefits from any revenue increases based on the cost pass-through analysis. EPA adjusted the baseline ATCF to reflect the effects of the regulation as follows:

$$ATCF_{PC} = (1-\tau)[(REV + \Delta REV)-(TC+\Delta C)-(I+\Delta I)] - CC + [\tau(D+\Delta D)] \quad (5.3)$$

where:

- $ATCF_{pc}$ = post-compliance after-tax cash flow;
- ΔREV = post-compliance change in revenue, as calculated in the cost pass-through analysis;
- ΔC = operating and maintenance costs of compliance;
- ΔI = change in interest expense after borrowing for compliance investments;
- CC = annual capital cost of compliance;
- ΔD = change in depreciation expense after compliance investments; and
- τ = the marginal corporate income tax rate (0.34).

All other variables are defined as in the baseline ATCF calculation.

The ***operating and maintenance cost*** of compliance **(ΔC)** is the change in costs estimated to result from operating and maintaining pollution controls adopted to comply with effluent guidelines. Operating costs include the costs of monitoring. The annual capital cost of compliance represents a payment on principal for debt-financed compliance investments. Financing costs calculated are based on a 7 percent rate. EPA calculated the change in depreciation (ΔD) for tax purposes as the straight-line depreciation of compliance investment outlays over a 15-year recovery period.

EPA determined that a facility with negative average post-regulation ATCF was subject to severe financial stress under the ATCF test and would be a candidate for post-regulatory closure.

❖ ***Net present value test***

EPA applied the NPV test for survey respondents that provided liquidation values, including any post-closure costs or liabilities. Some facilities may have a financial incentive to remain open and comply with the proposed MP&M rule even in the presence of negative cash flows, if they would incur substantial closure costs that exceed the value recovered by selling assets. NPV is the present value of expected future earnings less the liquidation value (including closure and post-closure costs) of the business. A business owner with a negative NPV is financially better off closing and liquidating than keeping the business open. Considering both the ATCF and the NPV tests improves the accuracy of the closure analysis, because it identifies as closures those facilities that would lose money and would not incur substantial costs exceeding assets if they closed.

The NPV test includes these calculations:

1. *Adjust for tax losses or gains on liquidation of facility assets*. EPA compared the facility's liquidation value with a going-concern value based on after-tax cash flow. EPA adjusted the calculated liquidation value for the tax cost (or benefit) resulting from capital gains (or losses). This adjustment involved subtracting asset book values as reported in the facility's balance sheet from the facility's reported asset liquidation values, yielding a capital gain (or loss, if negative) on liquidation. EPA also subtracted any reported extraordinary liability items accompanying liquidation, to yield a net gain (or loss) for tax purposes at facility liquidation. Multiplying this value by the 0.34 tax rate provided a net tax liability (or benefit, if the value was negative) upon liquidation. EPA subtracted this value from the reported liquidation value to give an after-tax liquidation value. The methodology assumes that firms have sufficient income to use all the tax gains due to capital losses.

2. *Calculate **total after-tax cash flow** **(TATCF)** available for all capital on an after-tax, total capital basis*. EPA calculated cash flow on an after-tax, total capital basis, to make the cash NPV and liquidation values comparable. The measure of cash flow discounted to calculate NPV includes interest payments, and therefore includes payments available to total capital, i.e., debt and equity. A comparable baseline TATCF is calculated as follows:

$$TATCF = \frac{REV - (TC + T)}{ATCF + I} \qquad (5.4a)$$

which is equivalent to:

$$TATCF = (1-\tau)(REV-TC) + \tau(I + D) \qquad (5.4b)$$

where:

TATCF	=	total after-tax cash flow available for all capital;
REV	=	revenue;
TC	=	total costs, including operating costs and fixed costs;
T	=	all income taxes (T = $\tau \times$ [REV - TC - I - D]);
ATCF	=	after-tax cash flow (as defined in the ATCF test above);
I	=	interest;
τ	=	corporate income tax rate; and
D	=	depreciation.

TATCF differs from ATCF in Eq. 5.4a only by the amount of interest payments: ATCF is after-tax cash flow available to equity, while TATCF is after-tax cash flow available to all capital. Interest expense is not adjusted for taxes when it is added back to the ATCF, however, since cash flow is increased by the tax deductibility of interest expenses. The benefit of the tax shield for both depreciation and interest is explicitly shown in Equation 5.4b.[4]

Post-compliance changes in financial parameters are the same as in the ATCF calculation (Equation 5.2).

3. *Calculate the present value of TATCF over 15 years.* EPA estimated the present value of the facility's expected future earnings by discounting TATCF over a 15-year period using a seven percent ***cost of capital***. The Agency elected 15 years as the length of the discounting period because EPA engineers expect compliance-related investments to have a useful life of at least 15 years.

[4] See Brealey and Myers, 1996 for a discussion of this method of cash flow analysis and valuation.

Extending the discounting period beyond 15 years would have had little effect on the NPV test results because discounting progressively reduces the contribution of out-year values to the calculated present value. The PV of TATCF is:

$$PV = \sum_{t=0}^{N} \frac{TATCF_t}{(1 + ACC)^t} \qquad (5.5)$$

where:

PV = present value of after-tax cash flows available for all capital i.e., the estimated value of the facility as a ***going concern***;

N = the number of years of cash flows analyzed minus one, since the first year's cash flow does not need to be discounted (N=14 in this analysis); and

ACC = average cost of capital (7% in this analysis).

4. *Compute the NPV*. The facility's NPV is the present value of its TATCF minus its after-tax, discounted liquidation value.

The NPV test threshold is zero. EPA presumes that the owners of a facility with an NPV less than zero would close the facility and liquidate its assets, if its cash flow is also negative.

❖ ***Severe impacts (closure) criteria***

EPA applied the ATCF alone for facilities that did not provide liquidation values. Facilities with negative baseline ATCF are baseline closures and are not attributed to the rule. Facilities with non-negative ATCF in the baseline case but negative post-compliance ATCF are regulatory closures due to the rule.

EPA applied both the ATCF and NPV tests to respondents that provided liquidation values. Facilities that fail both tests under baseline conditions are baseline closures. Facilities that pass at least one of the two tests in the baseline case but then fail both tests post-compliance are regulatory closures attributable to the rule.

Employment losses due to regulatory closures are equal to the employment numbers that each facility reported in its survey response. Output losses equal the total revenue at regulatory closures. Avoided baseline closures result in corresponding employment and output gains. EPA estimated national results by multiplying facility results by facility sample weights.

b. Test of moderate impacts

EPA also conducted an analysis of financial stress short of closure to identify moderate impacts due to the rule. Facilities experiencing moderate impacts are not projected to close due to the MP&M effluent guidelines. The rule might reduce their financial performance to the point where they might have somewhat more difficulty obtaining financing for future investments, however.

The analysis of moderate impacts examined two financial indicators:

Pre-Tax Return on Assets **(PTRA)**: The ratio of cash operating income to assets. This ratio measures facility profitability.

Interest Coverage Ratio **(ICR)**: The ratio of cash operating income to interest expenses. This ratio measures the facility's ability to service its debt and borrow for capital investments.

Creditors and equity investors review the above two measures as criteria to determine whether and under what terms they will finance a business. The PTRA and ICR also provide insight into a firm's ability to generate funds for compliance investments from internally-generated equity, i.e., from after-tax cash flow. The measures are defined as follows:

PTRA (net operating income divided by total assets) is a measure of the return earned on a firm's capital assets, independent of the effects of tax and financial structure. PTRA is a comprehensive measure of a firm's economic and financial performance. If a firm cannot sustain a competitive PTRA on a post-compliance basis, it may have difficulty financing the treatment investment, whether financing is to be obtained as debt, equity, or, more likely, a blend of the two.

$$PTRA = \frac{COI}{TA} \qquad (5.6)$$

where:

PTRA = pre-tax return on assets,

COI = cash operating income, and

TA = total assets.

Since COI = REV - TC,

$$PTRA = \frac{REV - TC}{TA} \qquad (5.7)$$

where:

PTRA = pre-tax return on assets,

REV = revenue,

TC = total costs, and
TA = total assets.

ICR [*pre-tax and pre-interest income* (cash operating income) divided by interest expense] is a measure of a firm's ability to service its contractual financial obligations on the basis of current, ongoing financial performance. Investors and creditors will be concerned about a firm whose operating cash flow does not comfortably exceed its contractual payment obligations. The greater the ICR, the greater the firm's ability to meet interest payments, and, generally speaking, the greater the firm's credit-carrying ability. ICR also provides a measure of the amount of cash flow available for equity after interest payments.

$$ICR = \frac{COI}{I} \quad (5.8)$$

where:
ICR = interest coverage ratio,
COI = cash income from operations, and
I = interest expense.

COI = REV - TC, therefore:

$$ICR = \frac{REV - TC}{I} \quad (5.9)$$

where:
ICR = interest coverage ratio,
REV = revenue,
TC = total costs, and
I = interest expense.

Adjusting for the effects of MP&M compliance costs, post-compliance PTRA and ICR are:

$$PTRA_{pc} = \frac{[(REV + \Delta REV) - (TC + \Delta TC)]}{(TA + TI)} \quad (5.10)$$

$$ICR_{pc} = \frac{[(REV + \Delta REV) - (TC + \Delta TC + \Delta I)]}{(I + \Delta I)} \quad (5.11)$$

where:
$PTRA_{pc}$ = pre-tax return on assets, post-compliance,
ICR_{pc} = interest coverage ratio, post-compliance,
Δ TC = change in total cost due to compliance, including an annual capital cost,
TI = treatment investment (assuming all of the front-end outlay would be capitalized and reported as an addition to assets on the balance sheet),
Δ = the change in the value for all variables due to compliance, and

all other variables are defined as before.

The incremental values for revenues, expenses, and interest are the same as described in the ATCF test discussion.

EPA compared baseline and post-compliance PTRA to an 8 percent threshold and baseline and post-compliance ICR to a threshold of 4 in this analysis. Both measures are important to financial success and firms' ability to attract capital. EPA assumed that firms with acceptable PTRA and ICR would not be subject to financial distress. Firms that do not fall below either threshold in the baseline but that do fall below one or both of the thresholds as a result of the rule are judged to experience moderate impacts short of closure attributable to the rule.

5.2.4 Impact Measures for Railroad Line Maintenance Facilities

The MP&M rule could potentially apply to some railroad facilities that maintain and repair railroad track and that perform similar operations on railroad and other vehicles. Railroad representatives indicated during data collection that the industry does not collect or monitor significant financial data at the facility level. These discussions led EPA to administer a modified version of the survey to railroad operating units and to perform the primary economic impact analysis at the operating unit level.

The analysis of impacts for railroad line maintenance facilities uses the same measures of impact as for other private MP&M facilities, but applies these measures for the railroad operating unit as a whole. Compliance costs for each railroad are the sum of compliance costs at each MP&M railroad line maintenance facility identified by the operating company.

5.2.5 Impact Measures for Government-Owned Facilities

Government-owned MP&M facilities include all facilities owned by government entities that discharge process wastewater from MP&M activities. Most government-owned facilities that fall under the MP&M rule provide or support transportation services. These facilities repair, rebuild, and maintain buses, trucks, cars, utility vehicles (e.g., snow-plows and street cleaners), and light

machinery. The MP&M profile describes government-owned facilities in detail.

Each government subject to the MP&M effluent guidelines at its facilities has a number of choices, which include:

Contracting out the service to a private provider or other governmental agency,
Discontinuing these services altogether, or
Paying for compliance and continuing operations.

The impact analysis does not predict how the government will respond. The analysis evaluates only whether a community incurring compliance costs and continuing operations under the rule would incur a severe burden. A government may choose a different option and avoid some of the budgetary impacts estimated here.

EPA evaluated impacts for government-owned facilities by using three tests. A government that fails all three tests is likely to suffer severe adverse impacts as a result of the rule. The first test is applied at the facility level, and the other two tests are applied at the government level.

a. Impacts on site-level cost of service test

The impacts on site-level cost of service test considers whether a government-owned facility's compliance costs exceed one percent or more of its total baseline cost of service. This test is similar to the test used to assess impacts on private facilities and firms, which compares costs to post-compliance revenues. The facility will likely absorb compliance costs within its current budget if those costs do not exceed one percent of the total. Compliance costs in this scenario will not significantly impact the municipal budget. Costs in excess of one percent do not, in and of itself, indicate that a budgetary impact will occur, but only that additional analysis should be performed to determine if there is an impact.

EPA calculated the ratio of compliance costs to cost of service, R_C, for each government-owned facility as follows:

$$R_C = \frac{TACC}{C_{Baseline}} \qquad (5.12)$$

where:

R_C = ratio of compliance costs to cost of service,
TACC = total annualized compliance cost for the facility, and
$C_{Baseline}$ = total baseline cost of service at the facility.

A facility whose R_C is equal to or greater than one percent fails this test.

b. Impacts on taxpayers test

The impacts on taxpayers test evaluates the significance of compliance costs to the people served by the government. A government will fail this test if the ratio of total annualized pollution control costs per household to median household income exceeds one percent, post-compliance.
Post-compliance pollution control costs include all pollution control costs (for whatever purpose) reported by the government in the baseline plus the sum of MP&M effluent guideline compliance costs at all MP&M facilities owned by the government. This test closely follows the methodology developed for EPA's Water Quality Standards Workbook (EPA, 1995).

The survey requests information about current municipal expenditures on pollution control. TACC for each government-owned facility is the sum of costs and an amortized capital cost. The sum of TACC at all MP&M facilities for each government, plus baseline municipal expenditures on pollution control, yields a post-compliance total annualized pollution control cost. EPA divided total annualized pollution control costs by the number of households to calculate an average cost per household. The questionnaire also asks for median household income in the geographic area served by the responding government.

EPA calculated a ratio of compliance costs to median household income, R_H, for each government as follows:

$$R_H = \frac{C_{BPB} + \sum_i TACC_i}{MHI} \qquad (5.13)$$

where:

R_H = ratio of total annualized pollution control cost to median household income,
C_{BPC} = total baseline municipal expenditures on pollution control, and
$TACC_i$ = total annualized compliance cost for government-owned facility *i*,
MHI = median household income for the government jurisdiction.

Governments that incur compliance costs that cause this ratio to exceed one percent fail this test. Governments that fail this test in the baseline as well as post-compliance are not judged to experience major budgetary impacts attributable to the rule. If the rule causes an increase in this ratio to above one percent, then EPA concludes that the rule might present a burden to the taxpayers that support the affected government. The calculation is a conservative estimate of the impact on taxpayers because it does not take into account the fact that non-residential taxpayers

(businesses) will bear some of the tax burden or that some costs might be recovered in fees.

This test is used in EPA's *Economic Guidance for Water Quality Standards*. This guidance is used by States and EPA Regions to assess economic factors in setting or revising water quality standards. The guidance includes as a screening measure of economic impact, average total pollution control cost per household divided by median household income. A value less than one percent indicates that a community would incur "little economic impact".[5]

c. Impacts on government debt test

The impacts on government debt test assesses the government's ability to finance compliance with the rule by issuing debt. A government must be able to finance capital compliance costs in addition to meeting ongoing compliance costs. Governments often finance capital compliance costs by issuing debt. This criterion tests each government's capacity to issue debt by examining the ratio of post-compliance debt service costs to the government's total revenue. This measure is analogous to the interest coverage ratio for private firms.

The ratio of debt service costs to revenue , R_D, for each government is:

$$R_D = \frac{D_B + C_k}{TR_B} \qquad (5.14)$$

where:

R_D = debt-to-revenue ratio;
D_B = baseline municipal debt service costs (principal payments and interest);
C_k = annualized capital cost of compliance, summed over all government-owned facilities in each government; and
TR_B = baseline municipal revenue.

EPA judged that debt service costs above 25 percent of revenues might impede a government's ability to issue debt in the future and present a burden on the budget.

This criterion is used in EPA's MUNIPAY model. This model is used in enforcement cases to assess whether municipalities (e.g., towns, villages, cities, counties, and public utilities) can afford to pay a specific level of compliance costs, Superfund cleanup contributions, or penalties. The model's affordability assessment limits the amount of debt that can finance these costs, capping the debt service ratio at 25 percent.[6] A higher ratio "may reduce the confidence of creditors that the municipality can repay its debt on time." The MUNIPAY manual states that this value slightly exceeds the "warning marks" found in the public finance and management literature.

5.3 RESULTS

This section presents the results of the facility impacts analyses. The first section presents the results of the baseline closure analysis. Section 5.3.2 covers the price increases predicted for the proposed rule, and subsequent sections report the results of the analyses for the proposed rule and the two other regulatory options that EPA analyzed. Section 5.3.3 presents an overview of impacts for all MP&M facilities, and then results are provided for indirect dischargers (Section 5.3.4), direct dischargers (Section 5.3.5), private facilities (Section 5.3.6), and government-owned facilities (Section 5.3.7). Section 5.3.8 provides results by subcategory.

5.3.1 Baseline Closures

Table 5.3 shows the results of the baseline closure analysis by subcategory. A total of 3,829 facilities have negative average After-Tax Cash Flow (ATCF) and (where calculated) a negative Net Present Value (NPV) in the baseline. These facilities are projected to close in the baseline and are not considered in the analysis of impacts attributable to the proposed rule.

Appendix A provides information on typical average closure rates in the MP&M industries. Census data show that over 10,000 facilities, or almost eight percent of all facilities in these industries, close annually. The number of baseline closures predicted in this analysis is consistent with this typical closure rate, and may even slightly understate baseline closures.

[5] Source: EPA's *Economic Guidance for Water Quality Standards: Workbook* (1995) (Chapter 2 "Evaluating Substantial Impacts: Public Sector Entities"). Values between one and two percent indicate potential "mid-range economic impact". Governments with values above one percent are subject to further analysis to determine whether a significant economic impact would in fact occur.

[6] Source: EPA Office of Compliance and Enforcement Assurance, *MUNIPAY User's Manual*, September 1999, p. 4-14.

Table 5.3: Summary of Baseline Closures

Subcategory	Total Number of Dischargers	Number of Baseline Closures	Percent Closing in the Baseline	Number Operating in the Baseline
General Metals	29,975	3,199	10.7%	26,776*
Metal Finishing Job Shop	1,530	286	18.7%	1,244
Non-Chromium Anodizing	190	40	21.1%	150
Printed Wiring Board	635	3	0.5%	632
Steel Forming & Finishing	153	6	3.9%	147
Oily Waste	29,425	295	1.0%	29,130
Railroad Line Maintenance	832	0	0.0%	832
Shipbuilding Dry Dock	11	0	0.0%	11
All Categories	62,752	3,829	6.1%	58,922*

* Excludes 64 facilities projected to close in the baseline that remain open under the proposed rule.
Source: U.S. EPA analysis

5.3.2 Price Increases

The price increases predicted for the proposed rule are shown in Table 5.4. The percentage price increases are small, falling well below one percent for most sectors and less than two percent in all cases.

Table 5.4: Cost Pass-Through Analysis: Percentage Price Increases under the Proposed Rule by Sector

Sector	Percent Price Increase
Aerospace	0.02%
Aircraft	0.03%
Bus and Truck	0.15%
Electronic Equipment	0.07%
Hardware	0.49%
Household Equipment	0.01%
Instrument	0.30%
Iron and Steel	0.81%
Job Shop	1.91%
Mobile Industrial Equipment	0.19%
Motor Vehicle	0.10%
Office Machine	0.06%
Ordnance	0.38%
Other Metal Products	0.03%
Precious and Non-Precious Metals	0.24%
Printed Circuit Board	1.59%
Railroad	0.05%
Ships and Boats	0.02%
Stationary Industrial Equipment	0.17%

5.3.3 Overview of Impacts

Table 5.5 provides an overview of the numbers of facilities closing and experiencing moderate economic impacts, by regulatory option. These national estimates include all types of dischargers (direct and indirect) and types of facilities (private MP&M, railroad line maintenance, and government-owned facilities.)

Table 5.5: Regulatory Impacts for All Facilities by Option, National Estimates

	Proposed Rule	Option 2/6/10	Option 4/8
Number of facilities operating in the baseline: total	58,922	58,922	58,922
private MP&M and railroad line maintenance	*54,590*	*54,590*	*54,590*
government-owned	*4,332*	*4,332*	*4,332*
Number of regulatory closures	199	1,282	2,963
Percent of facilities operating in the baseline that are regulatory closures	0.3%	2.2%	5.0%
Number of facilities operating post-regulation	58,787[a]	57,640	55,959
Number of facilities below low flow cutoffs	48,256[a]		
Number of facilities with subcategory exclusions	955		
Percent of facilities operating in the baseline excluded or below cutoffs	83.5%		
Number of facilities operating subject to regulatory requirements	9,576	57,640	55,959
Number of facilities experiencing moderate impacts	616	2,216	2,309
Percent of facilities operating in the baseline that experience moderate impacts	1.0%	3.8%	3.9%

a. Includes 64 avoided baseline closures -- general metals indirect dischargers below the low flow cutoffs that are projected to close in the baseline but that remain open under the proposed rule.
Source: U.S. EPA analysis.

Table 5.5 shows that the proposed rule substantially reduces facility-level impacts, compared to the alternative options considered by EPA. Only 199 (0.3 percent) of the facilities that continue to operate in the baseline close due to the proposed rule. Another 83 percent of facilities that continue to operate in the baseline are excluded from requirements, due to either the low flow cutoff for indirect dischargers or the exclusion of indirect dischargers in the Non-Chromium Anodizing, Shipbuilding Dry Dock and Railroad Line Maintenance subcategories. Significantly larger numbers of facilities are projected to close under Option 2/6/10 and Option 4/8 (1,282 and 2,963 respectively). See Chapter 4 for a discussion of the options, low flow cutoffs, and subcategory exclusions.

All facilities that are not exempted and that do not close are subject to requirements under these options. Of the 9,577 facilities that are subject to requirements and continue operating post-compliance, 616 facilities experience moderate impacts. These 616 facilities represent approximately one percent of all facilities that continue to operate in the baseline. Of the facilities with 616 moderate impacts under the proposed rule, the rule caused 137 to fall below the pre-tax return on assets threshold only, 38 to fall below the interest coverage ratio threshold only, and 441 to fall below both thresholds. Substantially more facilities experience moderate impacts under the other two regulatory options than under the Proposed Rule (2,216 for Option 2/6/10 and 2,309 for Option 4/8.)

Table 5.6 shows facility compliance costs by option, discharge status, and subcategory. These compliance costs are adjusted for the effect of taxes for privately-owned facilities, and therefore represent costs as experienced by the regulated facilities.

Table 5.6: Total Annualized Facility[a] Compliance Costs by Subcategory, Discharge Status, and Regulatory Option (after-tax, million 1999$)

Subcategory	Proposed Rule		Option 2/6/10		Option 4/8	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
General Metals	$132.3	$969.9	$132.3	$1,295.8	$195.1	$1,885.5
Metal Finishing Job Shop	$0.8	$80.1	$0.8	$80.1	$1.5	$112.1
Non-Chromium Anodizing		$0.0		$17.5		$26.0
Printed Wiring Board	$1.7	$93.4	$1.7	$93.4	$3.0	$141.2
Steel Forming & Finishing	$20.9	$14.0	$20.9	$14.0	$22.7	$21.8
Oily Waste	$9.3	$4.3	$9.3	$143.8	$50.0	$457.4
Railroad Line Maintenance	$0.8	$0.0	$0.8	$0.2	$0.9	$0.4
Shipbuilding Dry Dock	$1.4	$0.0	$1.4	$0.1	$0.4	$0.1
All Categories: Annual Costs	$167.2	$1,161.7	$167.2	$1,644.9	$273.6	$2,644.5
All Categories: Number of Facilities Operating Post-Compliance	4,633	54,154	4,633	53,008	4,615	51,344
All Categories: Number of Facilities Operating Post-Compliance Subject to Requirements	4,633	4,944	4,633	53,008	4,615	51,344
Total Costs to Industry by Option, Directs + Indirects	$1,328.9		$1,812.1		$2,918.1	

a. This table includes facility compliance costs only. Chapter 11 discusses the social costs of the proposed rule and other options. The estimates in this table exclude baseline and regulatory closures, and are post- or after-tax.
Source: U.S. EPA analysis.

The large number of General Metals indirect dischargers account for 73 percent of total compliance costs under the proposed rule. Total compliance costs incurred by facilities that continue to operate post-compliance are 36 percent higher under Option 2/6/10 than under the proposed rule, and 120 percent higher under Option 4/8 than under the proposed rule.

5.3.4 Results for Indirect Dischargers

Table 5.7 summarizes the results of the facility impact analysis for indirect dischargers, including both private businesses and government-owned facilities.

Table 5.7: Regulatory Impacts for Indirect Dischargers by Option, National Estimates

	Proposed Rule	Option 2/6/10	Option 4/8
Number of facilities operating in the baseline: total	54,270	54,270	54,270
private MP&M and railroad line maintenance	*50,592*	*50,592*	*50,592*
government-owned	*3,678*	*3,678*	*3,678*
Number of regulatory closures	179	1,262	2,925
Percent of facilities operating in the baseline that are regulatory closures	0.3%	2.3%	5.4%
Number of facilities operating post-regulation	54,154[a]	53,008	51,345
Number of facilities below low flow cutoffs	48,256[a]		
Number of facilities with subcategory exclusions	955		
Percent of facilities operating in the baseline excluded or below cutoffs	90.6%		
Number of facilities operating subject to regulatory requirements	4,943	53,008	51,345
Number of facilities experiencing moderate impacts	575	2,175	2,199
Percent of facilities operating in the baseline that experience moderate impacts	1.1%	4.0%	4.1%

a. Includes 64 avoided baseline closures -- general metals indirect dischargers below the low flow cutoffs that are projected to close in the baseline but that remain open under the proposed rule.
Source: U.S. EPA analysis.

Since indirect dischargers account for 92 percent of all facilities that continue to operate in the baseline, these results are similar to those shown in Table 5.5 for MP&M facilities as a whole. Over 90 percent of the indirect dischargers operating post-regulation are excluded from requirements by the low flow cutoffs and the subcategory exclusions for Non-Chromium Anodizing, Shipbuilding Dry Dock and Railroad Line Maintenance facilities under the proposed rule.

5.3.5 Results for Direct Dischargers

The analysis of facility impacts reflects the combined effects of small increases in revenues due to price increases and increased compliance costs for some facilities. Impacts on a specific facility depend on how its costs increase relative to its competitors', since all facilities benefit from the industry-wide price increases. Some facilities can even be better off financially under the proposed rule, for example, if they do not have costs due to flow and subcategory exclusions, or already have treatment in place and therefore incur minimal costs. The analysis indicated that 64 indirect discharging facilities would close under baseline conditions, but would continue operating under the proposed rule. All 64 facilities are in the general metals subcategory and below the low flow cutoff. The combination of small revenue increases and no compliance costs improves the financial performance of these facilities sufficiently to avoid the projected closures. Given the small number of these avoided closures (64 facilities out of almost 63,000 discharging facilities), EPA ignores these positive outcomes in the following discussions of facility impacts.

Table 5.8 summarizes the facility impact results for direct dischargers. Direct dischargers represent 8 percent of all facilities that continue to operate in the baseline. Table 5.8 shows that most direct dischargers operate subject to requirements under the proposed rule. Only 0.4 percent of direct dischargers are projected to close due to the rule. All of the MP&M facilities that discharge directly to surface waters either close or continue to operate under the proposed rule subject to the effluent guidelines. Impacts under the proposed rule are the same as Option 2/6/10 impacts, since the proposed rule does not include exclusions or low flow cutoffs for direct dischargers.

Table 5.8: Regulatory Impacts on Direct Dischargers by Option, National Estimates

	Proposed Rule	Option 2/6/10	Option 4/8
Number of facilities operating in the baseline	4,653	4,653	4,653
private MP&M and railroad line maintenance	*3,999*	*3,999*	*3,999*
government-owned	*654*	*654*	*654*
Number of regulatory closures	20	20	37
Percent of facilities operating in the baseline that are regulatory closures	0.4%	0.4%	0.8%
Number of facilities operating post-regulation subject to requirements	4,633	4,633	4,616
Number of facilities experiencing moderate impacts	41	41	110
Percent of facilities operating in the baseline that experience moderate impacts	0.9%	0.9%	2.4%

Source: U.S. EPA analysis.

5.3.6 Results for Private Facilities

Table 5.9 provides the facility impact analysis results for privately-owned facilities, including Railroad Line Maintenance facilities. Again, because privately-owned facilities account for 93 percent of all MP&M facilities that continue to operate in the baseline, these results are similar to the results reported for all MP&M facilities in Table 5.5. Almost 84 percent of facilities operating post-compliance are excluded from requirements under the proposed rule, either by the low flow cutoffs for indirect dischargers or by the exclusion for the three subcategories of indirect dischargers.

Table 5.9: Regulatory Impacts for Private Facilities by Option, National Estimates

	Proposed Rule	Option 2/6/10	Option 4/8
Number of privately-owned facilities operating in the baseline	54,591	54,591	54,591
Number of regulatory closures	199	1,282	2,963
Percent of facilities operating in the baseline that are regulatory closures	0.4%	2.3%	5.4%
Number of facilities operating post-regulation	54,456[a]	53,309	51,628
Number of facilities below low flow cutoffs	44,654[a]		
Number of facilities with subcategory exclusions	955		
Percent of facilities operating in the baseline excluded or below cutoffs	83.5%		
Number of facilities operating subject to regulatory requirements	8,848	53,309	51,628
Number of facilities experiencing moderate impacts	616	2,216	2,309
Percent of facilities operating in the baseline that experience moderate impacts	1.1%	4.1%	4.2%

a. Includes 64 avoided baseline closures -- general metals indirect dischargers below the low flow cutoffs that are projected to close in the baseline but that remain open under the proposed rule.
Source: U.S. EPA analysis.

5.3.7 Results for Government-Owned Facilities

Table 5.10 provides facility impact analysis results for government-owned facilities. The 4,332 government-owned facilities that continue to operate in the baseline represent 8 percent of all MP&M facilities operating in the baseline. The facility impact analysis does not include a methodology for predicting closures for government-owned facilities, and therefore assumes that all government-owned facilities continue operating post-compliance. EPA estimated major budgetary impacts for these facilities and the governments that own them instead. The analysis considers impacts at both the facility and at the government level.

Under the proposed rule, 83 percent of the government-owned facilities would be excluded from requirements because they fall below the low flow cutoff proposed for indirect dischargers. All government-owned facilities would be subject to requirements under Option 2/6/10 and Option 4/8. None of the options impose compliance costs for government-owned facilities that would result in significant budgetary impacts for the governments that operate the facilities.

Table 5.10: Regulatory Impacts for Government-Owned Facilities by Option, National Estimates

	Proposed Rule	Option 2/6/10	Option 4/8
Number of government-owned facilities operating in the baseline & post-regulation	4,332	4,332	4,332
Number of facilities below low flow cutoffs	3,603		
Number of facilities with subcategory exclusions			
Percent of facilities operating in the baseline excluded or below cutoffs	83.2%		
Number of facilities operating subject to regulatory requirements	729	4,332	4,332
Number of facilities experiencing impacts	0	0	0
Percent of facilities operating in the baseline that experience significant budgetary impacts	0%	0%	0%

Source: U.S. EPA analysis.

Tables 5.11 and 5.12 provide more detail on the results of the facility impact analysis for government-owned facilities. Table 5.11 shows the number of government-owned facilities by type and size of government, and the number that fall below relevant flow cutoffs under the proposed rule.

Table 5.11: Number of Government-Owned Facilities by Type and Size of Government Entity

	Municipal Government	State Government	County Government	Regional Governmental Authority	Total
Large Governments (population> 50,000)					
# of government entities > flow cutoff	60	183	77	0	319
# of government entities < flow cutoff	512	183	610	36	1,341
Small Governments (population <= 50,000)					
# of government entities > flow cutoff	410				410
# of government entities < flow cutoff	1,781		481		2,262
All Governments					
# of government entities > flow cutoff	470	183	77	0	729
# of government entities < flow cutoff	2,293	183	1,091	36	3,603
Total	2,763	366	1,167	36	4,332

Source: U.S. EPA analysis of Municipal Survey.

Table 5.12 provides additional detailed information on the results of the three tests performed in the government impact analysis. The table shows that 215 facilities incur costs exceeding one percent of their baseline costs of service. EPA assumes that facilities whose compliance costs fall below that threshold are likely to be able to absorb the costs within their current budgets. Governments that own MP&M facilities with compliance costs above that threshold do not necessarily experience government-level budgetary impacts, but should be evaluated further. The government-level analyses consider the sum of compliance costs incurred by each government for all its affected MP&M facilities. The test of impacts on households also considers the baseline pollution control costs paid by governments, and the test of impacts on government debt also considers the baseline debt service costs of the affected government. None of the governments analyzed incurred compliance costs under the proposed rule that would result in their failing either of the government-level impacts tests (impacts on households or impacts on government debt).

Table 5.12: Impacts on Governments of MP&M Facility Compliance Costs by Size of Government

	Owned by Small Governments		Owned by Large Governments		All Government-Owned Facilities	
Number of government-owned MP&M facilities affected	2,672		1,660		4,332	
	number	**percent**	**number**	**percent**	**number**	**percent**
Number and percent of governments failing all three budgetary impact criteria	0	0%	0	0%	0	0%
Individual Test Results: number and percent of failures						
Compliance costs > one percent of baseline cost of service test	140	5.2%	75	4.5%	215	5.0%
Impacts on taxpayers test	0	0%	0	0%	0	0%
Impacts on government debt test	0	0%	0	0%	0	0%

Source: U.S. EPA analysis.

The fact that no governments incur budgetary impacts at the government level is not surprising. The MP&M activities regulated under the proposed rule typically represent a very small portion of governments' budgets. Even a significant percentage increase in the cost of MP&M activities (as measured by the comparison of post-regulation costs to baseline costs) is unlikely to present any serious burden on the budgets of the affected governments.

Moreover, the costs to government-owned facilities are quite low. The large majority (3,603 or 83 percent) of the 4,332 government-owned facilities are excluded by the proposed low flow cutoffs for Oily Waste and General Metals subcategories, and therefore incur no costs. (All government-owned facilities fall into one of these two subcategories.) The facilities that are regulated include 212 facilities that incur no costs, and 517 that incur annualized costs of $27,360 on average.

5.3.8 Results by Subcategory

Table 5.13 provides a summary of facility-level impacts by subcategory, for indirect and direct dischargers separately. This table shows that substantial portions of the General Metals and Oily Waste indirect dischargers are exempted by the low flow exemptions.

Metal Finishing Job Shops account for the largest number of closures among indirect dischargers in the proposed rule, and Printed Wiring Board and Metal Finishing Job Shop facilities together account for the largest portion of moderate impacts. Most of the direct discharger impacts (closures and moderate impacts) are in the General Metals subcategory, although the closures and moderately-impacted facilities represent a small percentage of the General Metals direct discharging facilities as a whole. See the regulatory flexibility / SBREFA analysis in Chapter 10 for more information on the Metal Finishing Job Shop and Printed Wiring Board subcategories.

Table 5.13: Regulatory Impacts by Subcategory, Proposed Rule, National Estimates

Subcategory	# Facilities Operating in Baseline	Regulatory Closures	% Closures	# Exempted	% Exempted	# with Moderate Impacts	% Moderate Impacts
Indirect Dischargers							
General Metals	23,140	24	0.1%	20,164[a]	87%	153	0.7%
Metal Finishing Job Shop	1,231	128	10.4%	0	0%	117	9.5%
Non-Chromium Anodizing	150			150	100%		
Printed Wiring Board	620	7	1.1%	0	0%	301	48.7%
Steel Forming & Finishing	105	6	5.7%	0%	0%	4	3.8%
Oily Waste	28,219	14	<.0.1%	28,092	99.5%	0	0%
Railroad Line Maintenance	799			799	100%		
Shipbuilding Dry Dock	6			6	100%		
All Indirect Dischargers	54,270	179	0.3%	49,211[a]	91%	575	1.1%
Direct Dischargers							
General Metals	3,636	20	0.6%	0	0%	34	0.9%
Metal Finishing Job Shop	12	0	0%	0	0%	0	0%
Non-Chromium Anodizing							
Printed Wiring Board	11	0	0%	0	0%	0	0%
Steel Forming & Finishing	43	0	0%	0	0%	7	16.3%
Oily Waste	911	0	0%	0	0%	0	0%
Railroad Line Maintenance	34	0	0%	0	0%	0	0%
Shipbuilding Dry Dock	6	0	0%	0	0%	0	0%
All Direct Dischargers	4,653	20	0.4%	0	0%	41	0.9%

a. Includes 64 avoided closures -- general metals indirect dischargers that are projected to close in the baseline but which operate under the proposed rule and are eligible for the low flow cutoff.
Note: may not sum to totals due to independent rounding.
Source: U.S. EPA analysis.

GLOSSARY

after-tax cash flow (ATCF): after-tax cash flow available to equity.

avoided baseline closure: occurs if a facility fails the baseline tests but passes the post-compliance tests.

baseline closure: facilities showing inadequate financial performance in the baseline, that is, in the absence of the rule. These facilities closures would have occurred with or without the rule.

Construction Cost Index (CCI): measures how much it cost to purchase a hypothetical package of goods and services compared to what is was in the base year. It applies to general construction costs. The CCI can be used where labor costs are a high proportion of total costs. The CCI uses 200 hours of common labor, multiplied by the 20-city average rate for wages and fringe benefits. (http://www.enr.com/cost/costfaq.asp)

cost pass-through analysis: calculates the percentage of compliance costs that EPA expects firms subject to regulation to recover from customers through increased revenues.

facility: a contiguous set of buildings or machinery on a piece of land under common ownership.

government-owned facility: includes facilities operated by municipalities, state agencies and other public sector entities such as state universities.

interest coverage ratio (ICR): ratio of cash operating income to interest expenses. This ratio measures the facility's ability to service its debt and borrow for capital investments.

liquidation value: net amount that could be realized by selling the assets of a firm after paying the debt. (http://www.duke.edu/~charvey/Classes/wpg)

moderate impacts: adverse changes in a facility's financial position that are not threatening to its short-term viability.

net present value (NPV): present value of the expected future cash flows minus the cost. (http://www.duke.edu/~charvey/Classes/wpg)

operating and maintenance (O&M): costs estimated to result from operating and maintaining pollution controls adopted to comply with effluent guidelines. Operating costs include the costs of monitoring.

pre-tax return on assets (PTRA): ratio of cash operating income to assets. This ratio measures facility profitability.

private MP&M facility: includes all privately-owned facilities that do not perform railroad line maintenance.

Producer Price Index (PPI): a family of indexes that measures the average change over time in the selling prices received by domestic producers of goods and services. PPI's measure price change from the perspective of the seller. This contrasts with other measures, such as the Consumer Price Index (CPI), that measure price change from the purchaser's perspective. Sellers' and purchasers' prices may differ due to government subsidies, sales and excise taxes, and distribution costs. (http://stats.bls.gov/ppifaq.htm#1)

railroad line maintenance facility: facilities that maintain and repair railroad track and other vehicles.

regulatory closure: a facility that is predicted to close because it can not afford the costs of complying with the rule.

severe impacts: facility closures and the associated losses in jobs, earnings, and output at facilities that close due to the rule.

total after-tax cash flow (TATCF): after-tax cash flow available to all capital.

total annualized compliance cost (TACC): sum of annual operating and maintenance costs and the annualized equivalent of one-time costs, calculated over 15 years assuming a seven percent discount rate.

ACRONYMS

ATCF: after-tax cash flow
CCI: construction cost index
ICR: interest coverage ratio
O&M: operation and maintenance
NPV: net present value
PPI: producer price index
PTRA: pre-tax return on assets
TACC: total annualized compliance cost
TATCF: total after-tax cash flow

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